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मानक

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IS 9912 (1981): Coal Tar Based Coating Materials and Primers for Protecting Iron or Steel Pipelines [PCD 6: Bitumen Tar and their Products]



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“Knowledge is such a treasure which cannot be stolen”

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लोहे अथवा इस्पात की पाइपलाइनों के संरक्षण के लिए कोलतार
आधारित लेपन सामग्री और प्राइमर — विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

COAL TAR BASED COATING MATERIAL AND
PRIMERS FOR PROTECTING IRON OR
STEEL PIPELINES — SPECIFICATION

(*First Revision*)

ICS 93.080.20

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Bitumen, Tar and Their Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Hot applied coal tar based coatings and their associated primers are extensively used for protecting buried iron and steel pipelines from soil effects like electrophoresis movement of moisture, microbial interactions, anaerobic bacterial effect and effect of soil chemicals. Protective coatings and primers cannot be effective if these are not selected and used properly. Primers are normally used during the first application of the coating materials.

The Committee responsible for the formulation of this standard has taken into consideration the views of producers, consumers and technologists and has related the standard to the manufacturing and trade practices followed in the country in this field. Care has also been taken to the need for international coordination among standards prevailing in different countries of the world.

In this standard major changes in properties of coating and suitable primer materials detailed in Tables 1, 2 and 3 have been included. Type II coating material has been taken from grade 120/5 in BS : 4164 - 2002.

The following standards that cover the Codes of practice in application of coal tar based coating materials and suitable primers for protecting iron or steel pipelines are also available:

<i>IS No.</i>	<i>Title</i>
8062 (Part 2) : 1976	Code of practice for cathodic protection of steel structures: Part 2 Underground pipelines
10221 : 1982	Code of practice for coating and wrapping of underground mild steel pipelines

In the formulation of this standard, considerable assistance has been derived from BS : 4164 - 2002 'Specification for coal tar based hot applied coating materials for protecting iron and steel including a suitable primer' and AWWA C 203-2002 'Coal tar protective coatings and linings for steel water pipelines — Enamel and tape — Hot applied'.

Reference is made to Standards of other bodies like ASTM as Indian Standards on the subject are presently not available. Once the Indian Standards are formulated references to ASTM shall be replaced by Indian Standards.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified values in the standard.

Indian Standard

COAL TAR BASED COATING MATERIAL AND PRIMERS FOR PROTECTING IRON OR STEEL PIPELINES — SPECIFICATION

(*First Revision*)

1 SCOPE

This standard specifies requirements of hot applied coal tar based coatings and their associated primers used for protecting iron and steel pipes. This standard covers two types of coating materials suitable for extremes of temperature (*see* Table 1).

2 REFERENCES

The following standards contain provisions, which through reference in the text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
101	Methods of sampling and test for paints, varnishes and related products:
(Part 1/Sec 5) : 1989	Tests on liquid paints (general and physical), Section 5 Consistency (<i>third revision</i>)
(Part 1/Sec 6) : 1987	Tests on liquid paints (general and physical), Section 6 Flash point (<i>third revision</i>)
(Part 2/Sec 2) : 1986	Tests on liquid paints (chemical examination), Section 2 Volatile matter (<i>third revision</i>)
(Part 3/Sec 1) : 1986	Tests on liquid paint film formation, Section 1 Drying time (<i>third revision</i>)
460 (Part 1) : 1978	Specification for test services : Part 1 Wire cloth test sieves (<i>second revision</i>)
1201 : 1978	Methods for testing tar and bituminous materials: Sampling (<i>first revision</i>)
1202 : 1978	Methods for testing tar and bituminous materials: Determination of specific gravity (<i>first revision</i>)

IS No.

Title

1203 : 1978	Methods for testing tar and bituminous materials: Determination of penetration (<i>first revision</i>)
1205 : 1978	Methods for testing tar and bituminous materials: Determination of softening point (<i>first revision</i>)
1217 : 1978	Methods for testing tar and bituminous materials: Determination of mineral matter (<i>first revision</i>)
1607 : 1977	Methods of test sieving (<i>first revision</i>)

3 TERMINOLOGY

For the purpose of this standard the following definitions shall apply.

3.1 Coal Tar Based — It is derived from crude coal tar produced only by the high temperature carbonization of coal.

3.2 Coating Material — Hot applied pitch formulations intended to be applied on iron and steel pipes.

3.3 Fillers — Inert solid mineral matter free of lime, mica and silica included in coating materials to improve their characteristics without entering into combination or reacting with any of the other ingredients.

3.4 Hot Applied — Materials of such a consistency at ambient temperatures that heating is required for the purpose of application.

3.5 Primer — A material applied as a thin film to metal in order to ensure, after drying, adhesion of the subsequent protective coating.

4 MATERIAL

4.1 Hot Applied Coating Material

The material shall be produced by digestion of bituminous coal or its selected fractions suitable for this purpose together with an approved inert filler (like talc, etc) sized to ensure that not less than 100 percent passes through 45-micron IS Sieve [*see* IS 460 (Part 1)]. The material shall be of Type I or Type II complying with the requirements as given in Table 1 when tested by the method specified therein.

Table 1 Requirements of Hot Applied Coating Material (Coal Tar Enamel)
(Foreword, and Clauses 1 and 4.1)

SI No.	Characteristic	Requirements		Methods of Test, Ref to IS No./ Annex/ASTM
		Type I (3)	Type II (4)	
(1)	(2)			(5)
i)	Softening point, °C	104-116	120-130	IS 1205
ii)	Filler content by ignition, percent by mass	25-35	25-35	IS 1217
iii)	Fineness of filler, percentage passing 75 µm IS Sieve, <i>Min</i>	90	90	IS 1607
iv)	Specific gravity at 25°C	1.4-1.6	1.4-1.6	IS 1202
v)	Penetration, 10 ⁻¹ mm:			
	a) 25°C, 100 g, 5 s	5-10	1-9	IS 1203
	b) 48°C, 50 g, 5 s	12-30	3-16	IS 1203
vi)	High temperature Sag test, mm, <i>Max</i> :			B
	a) 71°C for 24 h	1.6	—	—
	b) 80°C for 24 h	—	1.5	—
vii)	Deflection test (Initial test):			C
	a) First crack, mm, <i>Min</i>	12	—	—
	b) Disbonded area, mm ² , <i>Max</i>	3 200	—	—
viii)	Deflection test (after heating):			C
	a) First crack, mm, <i>Min</i>	7.5	—	—
	b) Disbonded area, mm ² , <i>Max</i>	5 200	—	—
ix)	Impact test:			D
	a) Direct impact, disbonded area, mm ² , <i>Max</i>	10 300	—	—
	b) Indirect impact, disbonded area, mm ² , <i>Max</i>	3 900	—	—
x)	Peel test, mm, <i>Max</i> at			
	30°C	No peeling	No peeling	E
	40°C			
	50°C			
	60°C			
xi)	Cathodic disbondment test at 23°C for 28 days, mm, <i>Max</i>	5.0	5.0	F
xii)	Volume resistivity, ohm-cm, <i>Min</i>	10 ¹³	—	ASTM D 257
xiii)	Dielectric strength between polished hemispheric electrodes of 12.5 mm (½") diameter separated by a gap of 2.54 mm, kV, <i>Min</i>	25 (10 kV/mm)	—	ASTM D 176
xiv)	Service temperature limitations, <i>Max</i> :			
	a) Interior lining, °C	32	38	—
	b) Exterior coating, °C	71	80	—

(or up to 115°C
for offshore
pipelines)

NOTES:

1 Bond testing may be done by deflection (initial test), deflection (after heating) or by impact test depending upon the equipment available.

2 If the coated pipes are to be stored at high ambient temperature >40°C, then only Type II coal tar enamel should be used.

3 The softening point range for Type II grade may be exceeded by agreement between the manufacturer and the purchaser.

4 Preparation of test specimens for conducting Sag test as per Annex A, High temperature Sag test (see Annex B), Deflection test (see Annex C), Impact test (see Annex D), Peel test (see Annex E), and Cathodic disbondment test (see Annex F).

4.2 Primers

The primers shall be of two types, namely, Type A and Type B.

4.2.1 Type A

Coal tar primer shall be composed of processed coal tar pitch suitably blended with selected grades of solvents, to a fluid that may be applied cold by brushing, spraying or any other method. Type A primer shall also comply with the requirements given in Table 2.

4.2.2 Type B

Synthetic primer shall consist of chlorinated rubber and synthetic plasticizer together with solvents needed to give a consistency suitable for application by brush or spray. Type B primer shall comply with the requirements of Table 3.

Table 2 Requirements of Type A Primers (Coal Tar Primer)
(Foreword, and Clauses 4.2.1 and A-2.1)

SI No.	Characteristic	Requirement	Method of Test, Ref to IS No.
(1)	(2)	(3)	(4)
i)	Drying time (to touch) at 70 percent relative humidity and 30°C, h, <i>Max</i>	12	IS 101 (Part 3/Sec1)
ii)	Flash point (Abel), °C, <i>Min</i>	23	IS 101 (Part 1/Sec 6)
iii)	Volatile matter (145-150°C), percent loss by mass	30-50	IS 101 (Part 2/Sec 2)
iv)	Filler material	None shall be present	IS 1217
v)	Boiling point of solvent °C, <i>Max</i>	215	—
vi)	Penetration of residue at 25°C, 100 g, 5 s, 10 ⁻¹ mm	5-7	IS 1203
vii)	Softening point of residue °C, <i>Min</i>	110	IS 1205

Table 3 Requirements of Type B Primers (Synthetic Primer)
(Foreword, and Clauses 4.2.2 and A-2.1)

SI No.	Characteristic	Requirement	Method of Test, Ref to IS No.
(1)	(2)	(3)	(4)
i)	Drying time (to touch) at 70 percent relative humidity and 30°C, h, <i>Max</i>	5-20	IS 101 (Part 3/ Sec 1)
ii)	Flash Point (Abel), °C, <i>Min</i>	23	IS 101 (Part 1/Sec 6)
iii)	Viscosity (flow time at 20°C by No. 3 Flow cup)	35-50	IS 101 (Part 1/Sec 5)
iv)	Volatile matter (100-110°C), percent loss by mass, <i>Max</i>	75	IS 101 (Part 2/Sec 2)

5 SAMPLING

5.1 For the coating material, 20 kg sample shall be taken in accordance with IS 1201.

5.1.1 In the event of any coating material failing to meet the specified test requirements, the manufacturer shall be at liberty to retest the material. For the retest, two further packages shall be selected from the bulk of the material and sampled according to IS1201. The material shall be considered to comply with the specifications, if atleast two out of the three results for

each test are satisfactory. In the event of failure, when the consignment is made up of several batches, further tests may be made on every individual batch in the consignment and those which pass the tests shall be deemed to comply with the standard.

5.2 For sampling of primers not less than 1 000 ml shall be drawn either at the filling stage or from one of more previously unopened containers. The sample shall then be put into a suitable, clean, dry, air-tight container. Each sample container shall be properly sealed and marked with full details and date of sampling.

6 MARKING

6.1 Each container shall be legibly and indelibly marked with the following:

- Manufacturer's name or trade-mark, if any;
- Date of manufacture; and
- Type of primer (*see* 4.2).

6.2 BIS Certification Marking

The containers may also be marked with the Standard Mark.

6.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(Table 1, Note 4)

PREPARATION OF TEST SPECIMENS

A-1 PREPARATION OF THE TEST PLATES

A-1.1 Surface of the Test Plates

The surfaces of the test plates used for carrying out tests mentioned under Annex B to F shall be first freed from oil and grease. The surface of each plate shall then be blasted to a uniform steel grey finish, completely removing rust, mill scale, and all other foreign matters. For blasting, dry sand 600 μ IS Sieve shall be used with an air pressure of not less than 5.3 kg/cm². Care should be taken to ensure that the blasted steel surfaces do not subsequently become contaminated with oil or grease.

A-1.2 Test Plates

Steel plates of suitable sizes shall be free of all oil and grease. One side of each plate shall be blasted to a uniform grey surface, with rust, mill scale and all other foreign matter completely removed. A profile of 3 mills (0.075 mm) is intended.

A-2 PRIMING OF TEST PLATES

A-2.1 All steel surfaces/plates freshly prepared as specified in A-1.1 shall be primed using an appropriate primer as specified in Tables 2 and 3. The primer shall be applied with a clean flat bristle brush of 25 mm width to the plates lying in horizontal position. The primer shall be applied at the rate of coverage specified by the manufacturer in such a manner that the surface is uniformly covered with an even film free from air bubbles. The primer shall be applied at an atmospheric temperature of not less than 15°C in a well ventilated atmosphere having a relative humidity not greater than 60 percent.

In the case of Type A primer, when the film is hard dry, the coating material shall be applied to the plate in accordance with A-3 not less than 16 h and not more than 72 h after application of the primer.

In the case of Type B primer, when the film is hard dry, the coating material shall be applied in accordance with A-3 not less than 2 h and not more than 5 days.

A-2.2 Priming of Test Plates

All test plates prepared shall be primed using the coverage recommended by manufacturer. The primer shall be applied with a clean flat-bristle brush of 25 mm width. Plates shall be primed and dried while laying horizontally in a well ventilated room.

A-2.3 Conditioning

These plates shall be kept in room, for drying where temperature shall be between 21° to 33°C and 65 \pm 2 percent relative humidity.

A-3 COATING OF TEST PLATES

A-3.1 For coating a single plate the method mentioned under A-3.1.1 to A-3.1.3 shall be followed.

A-3.1.1 Two kilograms of the coating material broken into pieces approximately 40 mm maximum dimension, shall be rapidly melted over a large gas burner in a metal container of uniform cross-section, 15 cm in diameter and 20 cm in height. The container shall be fitted with a lid and double bottom, the two thicknesses being tack welded in four places with an air gap of approximately 5 mm between them.

When the material begins to melt, it shall be stirred frequently until the temperature reaches that required for application, the lid being replaced between intervals of stirring. Immediately upon reaching the specified application temperature, approximately 200 g shall be skimmed off or rejected to prevent any skin being included in the test specimen. The remaining coating material, less the last 300 g, shall be applied to the surface of each plate, which shall be in a horizontal position and at a temperature between 15°C and 30°C, in such a manner that fresh coating material constantly strikes the specimen surface.

A-3.1.2 The coating material shall be applied to the thickness of 1.5 to 2.5 mm to each plate. It is convenient to adjust to this thickness by sweeping off the surplus hot coating with a warmed blade along guide rails at the preset distance immediately after coating.

A-3.1.3 The application temperature shall be as recommended by the coating manufacturer.

A-4 APPLICATION OF ENAMEL

A-4.1 Preparation of Enamel for Testing

The enamel shall be broken into pieces and rapidly melted in a metal container while stirring with a metal bar. A thick steel plate shall be interposed between the container and the gas flame to avoid superheating. The application temperature and instructions of applications shall be as recommended by the manufacturer.

ANNEX B

[Table 1, Sl No. (vi)]

HIGH TEMPERATURE SAG TEST

B-1 The test shall be carried out on test plates of size mentioned under **A-1.1**, prepared in accordance with **A-1**, primed in accordance with **A-2**, and coated with coating material prepared as described in **A-3**.

B-1.1 One plate 300 mm × 300 mm × 3 mm prepared as above with 15 mm uncoated border left around the four edges of the plate on which three lines shall be drawn parallel with one edge at 75 mm intervals across the surface of the coating material and continued on the uncoated surface of the plate to the edges, shall be tested as given in **B-2**. The lines shall be drawn in such

a way that the prepared surface shall not be damaged.

B-2 PROCEDURE

B-2.1 The plate as prepared shall be stored in a vertical position in an oven in which the temperature shall be maintained at 71°C / 80°C for 24 h. At the end of this period, the plates shall be removed and cooled to room temperature. Average of these sag of the scribed lines on the two plates shall be recorded as the sag of the coating. In cases of dispute the test shall be repeated in duplicate.

ANNEX C

[Table 1, Sl No. (vii) and (viii)]

DEFLECTION TEST (INITIAL TEST)**C-1 TEST SPECIMEN**

The test shall be carried out on test plates of size mentioned under **A-1.1**, prepared in accordance with **A-1**, primed in accordance with **A-2**, and coated with coating material prepared as described in **A-3**.

C-1.1 Conditioning

These test pieces shall be stored in a chamber in which the temperature shall be controlled at 4°C. After a 6 h period, the plates shall be tested for deflection on equipment in this chamber.

C-1.2 Procedure

The plates shall be supported on 3 mm radius knife edges which are spaced on 240 mm centres. The deflecting load shall be centrally applied across the plate by a 12 mm radius mandrel at the rate of 25 mm per minute (to produce tension in the coating) until cracking occurs, as indicated by an electrical holiday detector. The deflection producing the initial cracking shall be

recorded and deflection shall then be continued to a maximum distance of 37 mm. The specimen shall then be removed from the machine for examination. All disbonded coating shall be removed from the plate and the area of metal exposed on the four plates shall be measured. The average initial cracking and disbonded area shall be recorded.

C-1.3 Deflection Test (After Heating)**C-1.3.1 Test Pieces**

Four plates 250 mm × 100 mm × 1.5 mm shall be coated on one side with the material that has been maintained at the specific application temperature for 2 h. The material shall be stirred with a metal bar at intervals of 15 min during the heating period. A 6 mm thick steel plate shall be interposed between the container and the gas flame to avoid superheating. The application temperatures and method of application shall be as recommended by the coating manufacturer.

ANNEX D
 [Table 1, Sl No. (ix)]
IMPACT TEST

D-1 PREPARATION OF TEST SPECIMEN

The test shall be carried out on 300 mm × 300 mm × 3 mm test plate prepared in accordance with Annex A.

The plate shall be allowed to reach room temperature and then shall be immersed in a water bath held at a uniform temperature of 25°C for a period of at least 1 h before testing. The plate shall be removed from the water bath with a soft clean cloth, and immediately subjected to the impact tests.

D-2 DIRECT IMPACT TEST

The plate shall be supported on the true plane surface of a block of wood with the coated face uppermost. A 630 - 650 g steel ball with a well polished spherical surface shall be dropped from a height of 2.4 m above the surface of the plate, so as to strike the coating material at a point at least 100 mm from any edge of the plate. After the impact, the coating material shall be

examined for disbonding from the plate as described in D-4.

D-3 INDIRECT IMPACT TEST

After being subjected to direct impact, the plate shall be placed with the coated face down on a wooden block through which a 87 mm diameter hole has been cut. The same ball shall then be dropped from a height of 2.4 m above the surface of the plate so as to strike the steel plate at a point over the centre of the hole in the wooden support block. The point of impact shall be at least 75 mm from the point of direct impact. After the impact, the coating material shall be examined for disbonding from the plate as described in D-4.

D-4 ASSESSMENT AND RECORDING

Disbonded coating is that which can be easily and readily removed from the plate by the fingers or, with very little force, by the use of a knife, blade or similar instrument. After removal, the area of disbonded coating shall be measured and recorded.

ANNEX E
 [Table 1, Sl No. (x)]
PEEL TEST

E-1 PREPARATION OF TEST SPECIMENS

Two plates 300 mm × 300 mm × 12 mm shall be prepared as described in Annex A.

E-2 PROCEDURE

Store one plate in a horizontal position with the coating side up at room temperature for at least 12 h, but not more than 24 h. Test the condition of the bond over the temperature range 30-70°C at successive intervals of 30°C, 40°C, 50°C and 70°C with tolerance of ± 1°C for each temperature. Heat the plate by immersing it for a period of approx 30 min in a water bath maintained at the selected temperature. At the end of the heating period, remove the plate from the bath and immediately test peel as given below.

With a knife edge, cut two parallel lines through the coating approx 18 mm apart and 100 mm in length. With

the edge of the knife blade, cut under the coating strip at one end, and loosen the coating from the plate the full width of the strip for about 12 mm. Place the knife blade under the loosened end, and with a firm grip, apply a slow, steady pull upward on the coating strip. Measure and record the length to which the strip of coating has peeled or lifted prior to breaking. Peeling, stripping or lifting of not more than 3 mm shall be recorded as 'no peeling'. The use of the water bath for the 30°C test shall be omitted when the room temperature is in the range 30 ± 1°C.

E-3 BOND AFTER 72 h AT 70°C

Store the second test plate in a horizontal position, with the coating side up in a chamber maintained at 70 ± 1°C for 72 ± 2 h. At the end of this period, remove the plate, cool to room temperature, and test for condition of bond over a temperature range 30-70°C.

ANNEX F
{Table 1, Sl No. (xi)}
CATHODIC DISBONDING TEST

F-1 PRINCIPLE

A primed and coated test plate is subjected to a voltage of -1.500 V to induce disbonding. If the coating does not disbond more than a specified extent the integrity of the coating material is maintained.

F-2 APPARATUS

F-2.1 Stabilized dc Power Unit, having a controlled voltage output between 0 V and 10 V and a current capacity sufficient to supply 20 mA simultaneously to each test site in circuit.

F-2.2 Digital Voltmeter, range 1.999 V ($3\frac{1}{2}$ digit), input impedance 10^3 M Ω , accuracy 0.1 percent \pm digit as $23 \pm 1^\circ\text{C}$. Maximum offset input current not greater than 10 A to 11 A.

F-2.3 Variable Resistor, range $5\text{k}\Omega \pm 10$ percent, 1 W for each test site.

F-2.4 Fixed Resistor, $10\Omega \pm 2$ percent, 1 W for each test site.

F-2.5 Fixed Resistor, $510\Omega \pm 2$ percent, 1 W for each test site.

F-2.6 Flaw Detector, fitted with a soft metallic bristled straight brush approximately 75 mm length and 6 mm width with bristles 6 mm long, adjusted to provide a voltage of 10 kV so arranged that the maximum short circuit current is not greater than 8 mA.

F-2.7 Reference Electrode, saturated calomel type, constructed from glass or plastics with porous plug.

F-2.8 Platinum Wire, of 0.8 mm diameter, one 75 mm length for each test site.

F-2.9 Rigid Plastics Tube, of 50 mm nominal bore, one 60 mm length for each test site.

F-2.10 Elastomeric Adhesive, for fixing the plastics tube solution containers to the test surface.

NOTE — Suitable materials are two-part polysulphide rubber and silicon rubber.

F-2.11 Twist Drill, of 6 mm diameter

F-2.12 Lint-Free Paper Towel

F-3 REAGENTS

F-3.1 Sodium Chloride Solution, 3 percent m/V.

F-3.2 Phenolphthalein, Acid/Base Indicator

F-4 PROCEDURE

F-4.1 Prepare one test plate, measuring at least 200 mm \times 100 mm \times 15 mm, in accordance with Annex A.

F-4.2 Affix two plastic tubes perpendicular to the coated surface using a suitable elastomeric adhesive. Place them at a minimum distance of 33 mm from the panel ends and from each other with their centers on the centerline of the panel width. Leave overnight to allow the adhesive to cure fully.

F-4.3 Drill a 6 mm hole through the coating material to the metal surface in the centre of each test site, as a pre-damage area.

F-4.4 Fill each plastic tube to a depth of approx 50 mm with sodium chloride solution and connect the apparatus as shown in Fig. 1.

F-4.5 At intervals of 24 h record the voltmeter reading and adjust the variable resistor to correct any drift from the -1.500 V setting (see Fig. 2).

F-4.6 Continue the test for 28 days, maintaining the temperature at $20 \pm 5^\circ\text{C}$. After this period assess disbonding at both test sites in accordance with F-5. Then assess the bonding in accordance with F-5.

F-5 ASSESSMENT

F-5.1 Remove the plastic tube from each test site and wipe along the surface of the coating using a lint-free paper towel and cathode area material.

F-5.2 Make two parallel incisions through the coating and 12.5 mm apart across the panel so as to include the pre-damage area. The cuts should extend 50 mm on each side of the predamage area.

F-5.3 Using a square ended pallet knife inserts it into the centre portion of the pre-damage area, between the parallel cuts, down to the metal. Using a gentle levering action, lift the strip of coating, if possible, with a slow peeling action and then grip the coating between the blade and thumb and continue the peeling action until the coating breaks.

F-5.4 Repeat the peeling test in the opposite direction and then repeat the procedure at an angle of 90° to the first test.

F-5.5 Apply one spot of phenolphthalein acid/base indicator to the exposed metal surface at the outside edge and allow it to flow towards the pre-damaged area. The purple boundary indicates the extent of disbonding.

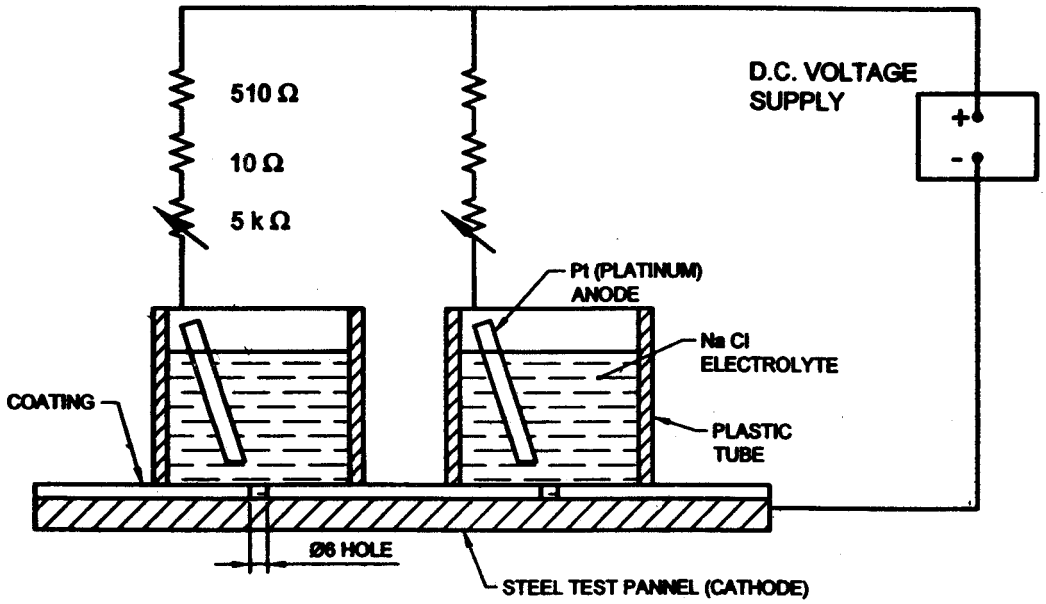


FIG. 1 CATHODIC DISBONDING TEST RIG

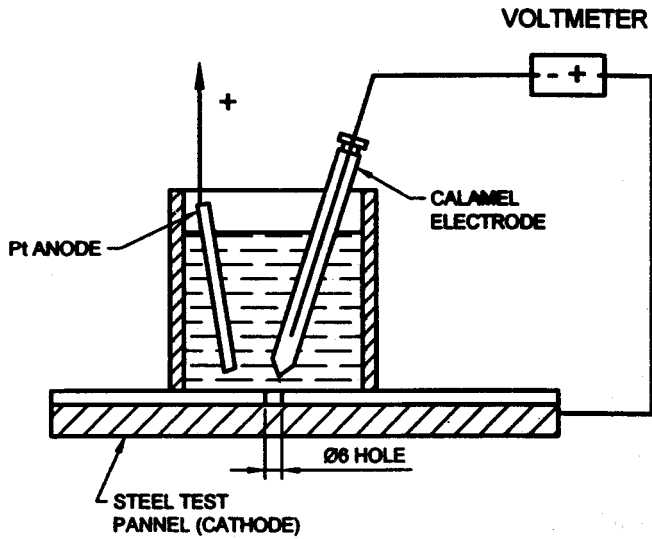


FIG. 2 VOLTAGE ADJUSTMENT CIRCUIT

Bureau of Indian Standards

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Review of Indian Standards

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This Indian Standard has been developed from Doc : No. PCD 6 (2260).

Amendments Issued Since Publication

Amendment No.	Date of Issue	Text Affected

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